

AMENDMENTS TO THE CLAIMS

1 1. (Original) A method of dynamically determining the spatial position and
2 orientation of a slider positioned above a transparent disk, the method comprising the steps
3 of:

4 directing one or more incident beams of light to the interface between the
5 slider and the disk;

6 simultaneously measuring values derived from one or more beams of light
7 reflected from said slider-disk interface, said simultaneously measured values respectively
8 corresponding with multiple testing points on the surface of the slider which are spaced apart
9 from each other; and

10 calculating the spatial orientation of the slider based on said simultaneously
11 measured values.

1 2. (Original) A method as claimed in claim 1, wherein said values are used to derive
2 an indication of the respective spacing between the surface of the transparent disk and each of
3 said multiple testing points on said slider surface.

1 3. (Original) A method as claimed in claim 1, wherein the number of said multiple
2 testing points is equal to or greater than the number of degrees of freedom said slider has in
3 its movement above the transparent disk, so that the spatial orientation of the slider can be
4 fully determined.

1 4. (Original) A method as claimed in claim 3, wherein said number of degrees of
2 freedom, and the number of said multiple values are both equal to three.

1 5. (Original) A method as claimed in claim 1, wherein the spatial orientation of the
2 slider is characterized in terms of (i) a spacing between the slider and the disk surface, (ii) a
3 pitch angle and (iii) a roll angle of the slider with respect to the disk surface.

1 6. (Original) A method as claimed in claim 1, wherein said one or more beams of
2 light each have two or more wavelengths, and said values include the relative intensities of
3 said two or more wavelengths after reflection from the slider-disk interface.

1 7. (Original) A method as claimed in claim 1, wherein said one or more beams of
2 light have two orthogonal vectors of polarisation, and said values include the intensities of
3 the two vectors of polarisation after reflection from the slider-disk interface.

1 8. (Original) A method as claimed in claim 7, wherein said one or more beams of
2 light are incident on said slider-disk interface at an angle substantially between 0° and 80°.

1 9. (Original) A method as claimed in claim 6, wherein said multiple values are
2 simultaneously measured by using a series of cascaded mirrors having pinholes to isolate
3 reflected light respectively corresponding with each of said multiple testing points from one
4 beam of light reflected from the slider-disk interface.

1 10. (Original) A method as claimed in claim 1, wherein said multiple values are
2 simultaneously measured by independently using more than one of said one or more beams of
3 light reflected from said slider-disk interface.

1 11. (Original) A method as claimed in claim 1, wherein the minimum flying height of
2 the slider is determined once the spatial orientation of the slider is determined, and the
3 surface geometry of the slider is known.

1 12. (Original) An apparatus for dynamically determining the spatial orientation of a
2 slider positioned above a transparent disk, the apparatus comprising:
3 optical means for directing one or more incident beams of light to the interface
4 between the slider and the transparent disk;
5 measuring means for simultaneously measuring values of light properties of
6 one or more beams of light reflected from said slider-disk interface, the simultaneously
7 measured values respectively corresponding with multiple testing points on the surface of the
8 slider which are spaced apart from each other; and
9 calculating means for calculating the spatial orientation of the slider based on
10 said simultaneously measured values.

1 13. (Original) An apparatus as claimed in claim 12, wherein said calculating means
2 can use said values measured by said measuring means to derive an indication of the
3 respective spacing between the surface of the transparent disk and each of said multiple
4 testing points on said slider surface.

1 14. (Original) An apparatus as claimed in claim 12, wherein the number of said
2 multiple testing points is equal to or greater than the number of degrees of freedom said slider
3 has in its movement above the transparent disk, so that the spatial orientation of the slider can
4 be fully determined.

1 15. (Original) An apparatus as claimed in claim 14, wherein said number of degrees
2 of freedom and the number of said multiple values are both equal to three.

1 16. (Original) An apparatus as claimed in claim 12, wherein the calculation means is
2 able to calculate the spatial position and orientation of the slider in terms of (i) a distance
3 from the transparent disk surface, (ii) a pitch angle and (iii) a roll angle.

1 17. (Original) An apparatus as claimed in claim 12, wherein said optical means is
2 able to provide one or more beams of light each have two or more discrete wavelengths, and
3 said measuring means is able to measure values which include the relative intensities of two
4 or more discrete wavelengths after reflection from the slider-disk interface.

1 18. (Original) An apparatus as claimed in claim 12, wherein said optical means is
2 able to provide one or more beams of light have two orthogonal vectors of polarisation, and
3 said measuring means is able to measure values which include the relative intensities of the
4 two vectors of polarisation after reflection from the slider-disk interface.

1 19. (Original) An apparatus as claimed in claim 18, wherein said optical means is
2 able to direct one or more beams of light to be incident on said slider-disk interface at an
3 angle substantially between 0° and 80°.

1 20. (canceled) An apparatus as claimed in claim 17, wherein said measurement means
2 is able to simultaneously measure said multiple values by using a series of cascaded mirrors
3 having pinholes to isolate reflected light respectively corresponding with each of said
4 multiple testing points from one beam of light reflected from the slider-disk interface.

1 21. (Original) An apparatus as claimed in claim 12, wherein said measurement means
2 is able to simultaneously measure said multiple values by independently using more than one
3 of said one or more beams of light reflected from said slider-disk interface.

1 22. (Currently Amended) An apparatus~~A method~~ as claimed in claim 12, wherein
2 the calculation means is able to determine the minimum flying height of the slider once the
3 spatial orientation of the slider is determined and the surface geometry of the slider is known.

1 23. (New) A method of dynamically determining the spatial position and orientation
2 of a slider positioned above a transparent disk, the method comprising the steps of:

3 directing one or more incident beams of light to the interface between the
4 slider and the disk, wherein said one or more beams of light each have two or more
5 wavelengths;

6 simultaneously measuring values derived from one or more beams of light
7 reflected from said slider-disk interface, said simultaneously measured values respectively
8 corresponding with multiple testing points on the surface of the slider which are spaced apart
9 from each other, said values include the relative intensities of said two or more wavelengths
10 after reflection from the slider-disk interface, said values are simultaneously measured by
11 using a series of cascaded mirrors having pinholes to isolate reflected light respectively
12 corresponding with each of said multiple testing points from one beam of light reflected from
13 the slider-disk interface ; and

14 calculating the spatial orientation of the slider based on said simultaneously measured
15 values.

1 24. (New) An apparatus for dynamically determining the spatial orientation of a slider
2 positioned above a transparent disk, the apparatus comprising:
3 optical means for directing one or more incident beams of light to the interface
4 between the slider and the transparent disk, said optical means is able to provide one or more
5 beams of light each have two or more discrete wavelengths;
6 measuring means for simultaneously measuring values of light properties of
7 one or more beams of light reflected from said slider-disk interface, the simultaneously
8 measured values respectively corresponding with multiple testing points on the surface of the
9 slider which are spaced apart from each other, said measuring means is able to measure
10 values which include the relative intensities of two or more discrete wavelengths after
11 reflection from the slider-disk interface, said measurement means is able to simultaneously
12 measure said multiple values by using a series of cascaded mirrors having pinholes to isolate
13 reflected light respectively corresponding with each of said multiple testing points from one
14 beam of light reflected from the slider-disk interface; and
15 calculating means for calculating the spatial orientation of the slider based on
16 said simultaneously measured values.